

NASA Research Grant NsG 237-62
Addendum to
The Semiannual Report for the Period
Ending February 28, 1965

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INTRODUCTION

This Addendum to the Semiannual Report provides information concerning research projects supported by NsG 237-62 which were not included in the report dated February 28, 1965.

PHYSICAL SCIENCES

ANTENNAE MEASUREMENTS

Account No. 448617

P. J. Coleman, Jr.
E. S. Gillespie

This project has been completed. UCLA Engineering Report entitled "The Scattering of a Plane Surface Wave by a Perfectly Conducting Strip" by E. S. Gillespie and J. Gustinic summarizes the results of this project. Twenty-five copies of this report have been forwarded to NASA. The abstract from this report appears below.

Abstract

The scattering of a surface wave by a metal strip above a dielectric clad ground plane is investigated both theoretically and experimentally. An expression for the Green's function which can be evaluated numerically is developed for the usual case for which the energy of the incident surface wave is "lightly trapped" by the dielectric. Using this expression, a variational formula for the reflection coefficient of the strip is developed and the Rayleigh-Ritz technique applied to yield approximate values for the reflection coefficient and surface currents of the strip. Numerical results are presented, discussed and compared to experimental values measured on a polystyrene coated aluminum table. Strips up to one wavelength in width positioned up to one wavelength above the dielectric are considered and agreement between theory and experiment is found to be quite good. A thorough description of the measurement apparatus and techniques is presented.

P. J. Coleman, Jr.
U. Fehr
B. Ben-Ary

This project is intended to provide an experimental study of the propagation of disturbances in the ionized regions of the magnetosphere. To facilitate this study, we are developing relatively sensitive magnetometers and acoustic detectors that can be operated at the earth's surface, in the atmosphere at various altitudes, and in the ionosphere at altitudes that can be reached by sounding rockets.

During the reporting period, acoustic detectors of the Moore Variometer type were employed in the continuation of a series of tests at Point Mugu. In these tests, we are attempting to determine the characteristics of signals recorded by these detectors in the presence of pressure variations generated by rocket exhausts. Most of the work during the period involved set-up and check-out of several observation stations equipped with acoustic detectors and recorders at Point Mugu. However, some data were obtained and are presently being reduced and analyzed. This initial analysis consists of determinations of the frequency spectra of the observed signals and the correlations between the signals and the correlations between the signals recorded at the various stations.

Work in the laboratory included the design and fabrication of an improved set of calibration chambers for the acoustic detectors. These chambers are larger and more precisely machined versions of the calibration chamber employed previously. These newer chambers, and the electronic equipment associated with them, are presently being installed and tested in the laboratory. We anticipate that these calibration facilities will be in operation in the next quarter.

CHEMISTRY AND SPECTROSCOPY UNDER HIGH FIELDS

C. A. Jensen
L. L. Wood

Account No. 448613

The Eastman Kodak Type IIaF and Type IIa0 Spectrographic plates were used in the Plasma Generator and F-Value programs. They were exposed on the Jarrell-Ash 2.6 meter spectrograph as part of the effort to determine relative and absolute oscillator strengths for optical transitions in the astrophysically important transition elements; the source employed was an IGPP plasma generator exciting a lightly doped hydrogen-helium plasma.

COSMIC RAY PHYSICS

D. J. Prowse

This project has been completed. Expenses shown for this period were incurred in the reporting period ending August 31, 1964 but, for accounting reasons, did not appear as expenditures until this reporting period.

A final report is being prepared. There are no plans to seek other support for the continuation of this project.

OSCILLATIONS OF FALLING SPHERES

U. Shafrir

Account No. 448612

The activity on this project was directed at making preparations for the continuation of Project FASTRAM. Current plans call for experiments to be performed at the Naval Ordnance Laboratory, White Oak, Maryland during the summer of 1965.

BIOLOGICAL SCIENCES

MARINE BIOLOGY

K. S. Norris
R. N. Turner

Account No. 448672

Support for this project was of an interim nature. Expenses shown for this period were incurred in the reporting period ending August 31, 1964 but, for accounting reasons, did not appear as expenditures until this reporting period. This project is continuing under National Institute of Health Support, Grant Number USPH NB 05427.

A report of the results obtained while receiving NASA support appeared in the Semiannual Report for the period ending August 31, 1964.

ENGINEERING

LOW DENSITY GAS FLOWS

N. Rott
M. Oberai

Account No. 448638

Dr. Madan Oberai, who has successfully completed his work on the application of the Mott-Smith model to the shock structure in gas mixtures, turned his attention to the application of the Mott-Smith method to the structure of curved shocks. Based upon his previous experience with the problem using the Navier-Stokes shock structure, Dr. Oberai was able to come to a solution of the problem in a very short time. He is now preparing a report on the subject.